

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-9. (Cancelled)

Claim 10. (Original) A shift control apparatus of an automatic transmission of a motor vehicle in which a coast downshift is carried out during coasting of the vehicle, the automatic transmission including a plurality of hydraulically operated friction elements, the shift control apparatus comprising:

a shift controller that causes the coast downshift to be carried out while the vehicle is kept in a minimal driving state in which an engine speed is slightly higher than an input shaft speed of the automatic transmission; and

a hydraulic pressure setting unit that sets a hydraulic pressure applied to at least one of the friction elements associated with the coast downshift during a shifting period, according to the minimal driving state.

Claim 11. (Original) The shift control apparatus according to claim 10, wherein:

the coast downshift is a clutch-to-clutch downshift effected by releasing one of the friction elements as a release-side friction element and engaging another of the friction engaging elements as an engagement-side friction element; and

the hydraulic pressure setting unit determines an initial pressure of the release-side friction element and an initial pressure of the engagement-side friction element, according to the minimal driving state.

Claim 12. (Original) The shift control apparatus according to claim 11, further comprising:

an input and output rotation speed detecting unit that detects input and output rotation speeds of a fluid coupling device provided between the automatic transmission and an engine, wherein the hydraulic pressure setting unit sets the initial pressures of the release-side friction element and the engagement-side friction element, based on the input and output rotation speeds of the fluid coupling device detected by the input and output rotation speed detecting unit.

Claim 13. (Original) The shift control apparatus according to claim 11, further comprising a braking-time correcting unit that increases an engaging pressure for the engagement-side friction element in real time in accordance with a decelerating state of the vehicle while the vehicle is being braked.

Claim 14. (Original) The shift control apparatus according to claim 11, wherein a parameter associated with an engaging pressure for the engagement-side friction element is corrected based on a temperature of a working oil supplied to the engagement-side friction element.

Claim 15. (Original) The shift control apparatus according to claim 11, wherein a parameter associated with an engaging pressure for the release-side friction element is corrected based on a temperature of a working oil supplied to the release-side friction element.

Claim 16. (Currently Amended) ~~[[A]] The shift control apparatus of an automatic transmission of a motor vehicle in which a coast downshift is carried out during coasting while the vehicle is kept in a minimal driving state in which an engine speed is slightly higher than an input shaft speed of the automatic transmission, the automatic transmission including a plurality of hydraulically operated friction elements according to Claim 10, further~~ comprising:

~~a hydraulic pressure controller that controls a hydraulic pressure applied to at least one of the friction elements associated with the coast downshift during a shifting period, according to the minimal driving state; and~~

a learning controller that corrects, by learning, the hydraulic pressure for the at least one friction element set by the hydraulic pressure ~~controller~~ setting unit during the shifting period.

Claim 17. (Currently Amended) The shift control apparatus according to claim 16, further comprising:

a speed difference detecting unit that detects a difference between input and output rotation speeds of a fluid coupling device provided between the automatic transmission and an engine of the vehicle,

wherein the hydraulic pressure ~~controller~~ setting unit sets an initial pressure of the at least one friction element associated with the coast downshift during the shifting period, based on the difference between the input and output rotation speeds of the fluid coupling device.

Claim 18. (Original) The shift control apparatus according to claim 17, wherein:

the coast downshift is a clutch-to-clutch shift effected by releasing one of the friction elements as a release-side friction element and engaging another of the friction elements as an engagement-side friction element substantially at the same time; and

the learning controller determines a tie-up condition of the clutch-to-clutch shift based on a temporary increase in the output rotation speed of the fluid coupling device, and corrects an engaging pressure for the engagement-side friction element by learning, depending upon the tie-up condition.

Claim 19. (Original) The shift control apparatus according to claim 18, wherein:

the learning controller determines that the clutch-to-clutch shift involves a strong tie-up condition when determining that the temporary increase in the output rotation speed of the fluid coupling device becomes substantially equal to zero, and that the input rotation speed of the fluid coupling device exceeds the output rotation speed thereof again after the input rotation speed falls below the output rotation speed from a condition in which that the input rotation speed is higher than the output rotation speed; and

the learning controller determines that the clutch-to-clutch shift involves a weak tie-up condition when determining that the temporary increase in the output rotation speed of the fluid coupling device becomes substantially equal to zero, and that the input rotation speed of the fluid coupling device is kept higher than the output rotation speed.

Claim 20. (Original) The shift control apparatus according to claim 18, wherein the learning controller corrects, by learning, an engaging pressure for the release-side friction element so that a period between a start of the clutch-to-clutch shift and a start of slipping of

the release-side friction element during the clutch-to-clutch shift becomes equal to a predetermined target period.

Claim 21. (Original) The shift control apparatus according to claim 18, wherein the learning controller corrects, by learning, an engaging pressure for the engagement-side friction element when a temporary increase in the output rotation speed of the fluid coupling device is larger than a predetermined value.

Claim 22. (Original) The shift control apparatus according to claim 16, further comprising:

a rapid braking state determining unit that determines whether the vehicle is being rapidly braked; and

a learning inhibiting unit that inhibits learning by the learning controller when the rapid braking state determining unit determines that the vehicle is rapidly braked.

Claims 23-27. (Cancelled)

Claim 28. (Original) A method for controlling shifting of an automatic transmission of a motor vehicle in which a coast downshift is carried out during coasting of the vehicle, the automatic transmission including a plurality of hydraulically operated friction elements, the method comprising the steps of:

causing the coast downshift to be carried out while the vehicle is kept in a minimal driving state in which an engine speed is slightly higher than an input shaft speed of the automatic transmission; and

setting a hydraulic pressure applied to at least one of the friction elements associated with the coast downshift during a shifting period, according to the minimal driving state.

Claim 29. (Original) The method according to claim 28, wherein:

the coast downshift is a clutch-to-clutch downshift effected by releasing one of the friction elements as a release-side friction element and engaging another of the friction engaging elements as an engagement-side friction element; and

the step of setting a hydraulic pressure comprises setting an initial pressure of the release-side friction element and an initial pressure of the engagement-side friction element according to the minimal driving state.

Claim 30. (Original) The method according to claim 29, further comprising the step of:

detecting input and output rotation speeds of a fluid coupling device provided between the automatic transmission and an engine,

wherein the initial pressures of the release-side friction element and the engagement-side friction element are set based on the input and output rotation speeds of the fluid coupling device.

Claim 31. (Original) The method according to claim 29, further comprising the step of increasing an engaging pressure for the engagement-side friction element in real time in accordance with a decelerating state of the vehicle.

Claim 32. (Currently Amended) ~~[[A]] The method for controlling shifting of an automatic transmission of a motor vehicle in which a coast downshift is carried out during~~

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~~coasting while the vehicle is kept in a minimal driving state in which an engine speed is slightly higher than an input shaft speed of the automatic transmission, the automatic transmission including a plurality of hydraulically operated friction elements according to Claim 28, further comprising the steps~~ step of:

~~controlling a hydraulic pressure applied to at least one of the friction elements associated with the coast downshift during a shifting period, according to the minimal driving state; and~~

correcting, by learning, the hydraulic pressure for the at least one friction element during the shifting period.

Claim 33. (Currently Amended) The method according to claim 32, further comprising the step of:

detecting a difference between input and output rotation speeds of a fluid coupling device provided between the automatic transmission and an engine of the vehicle,

wherein the step of ~~controlling~~ setting a hydraulic pressure comprises setting an initial pressure of the at least one friction element associated with the coast downshift during the shifting period, based on the difference between the input and output rotation speeds of the fluid coupling device.

Claim 34. (Original) The method according to claim 33, wherein:

the coast downshift is a clutch-to-clutch shift effected by releasing one of the friction elements as a release-side friction element and engaging another of the friction elements as an engagement-side friction element substantially at the same time; and

a tie-up condition of the clutch-to-clutch shift is determined based on a temporary increase in the output rotation speed of the fluid coupling device, and an engaging pressure

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for the engagement-side friction element is corrected by learning, depending upon the tie-up condition.

Claim 35. (Original) The method according to claim 34, wherein:

a strong tie-up condition of the clutch-to-clutch shift is determined when it is determined that the temporary increase in the output rotation speed of the fluid coupling device becomes substantially equal to zero, and that the input rotation speed of the fluid coupling device exceeds the output rotation speed thereof again after the input rotation speed falls below the output rotation speed from a condition in which that the input rotation speed is higher than the output rotation speed; and

a weak tie-up condition of the clutch-to-clutch shift is determined when it is determined that the temporary increase in the output rotation speed of the fluid coupling device becomes substantially equal to zero, and that the input rotation speed of the fluid coupling device is kept higher than the output rotation speed.

Claim 36. (Original) The method according to claim 34, wherein an engaging pressure for the release-side friction element is corrected by learning so that a period between a start of the clutch-to-clutch shift and a start of slipping of the release-side friction element during the clutch-to-clutch shift becomes equal to a predetermined target period.

Claim 37. (Original) The method according to claim 32, further comprising the steps of:

determining whether the vehicle is being rapidly braked; and
inhibiting correction of the hydraulic pressure by learning when it is determined that the vehicle is rapidly braked.